CHP
EPA COMBINED HEAT AND POWER PARTNERSHIP

# Renewable Portfolio Standards

## An Effective Policy to Support Clean Energy Supply

A Renewable Portfolio Standard (RPS) provides states with a mechanism to increase renewable energy generation using a cost-effective, market-based approach that is administratively efficient. An RPS requires electric utilities and other retail electric providers to supply a specified minimum amount of customer load with electricity from eligible renewable energy sources. The goal of an RPS is to stimulate market and technology development so that ultimately renewable energy will be economically competitive with conventional forms of electric power. States create RPS programs because of the energy, environmental, and economic benefits of renewable energy, and sometimes other clean energy technologies, such as energy efficiency and combined heat and power (CHP[1]).

### How Does a Renewable Portfolio Standard Encourage Clean Energy?

An RPS creates market demand for renewable and clean energy supplies. Currently, states with RPS requirements mandate that between one percent and 25 percent of electricity be

### What Are the Benefits of a Renewable Portfolio Standard?

The policy benefits of an RPS are the same as those from renewable energy and CHP:

- Environmental improvement (e.g., avoided air pollution, climate change mitigation, waste reduction, habitat preservation, conservation of valuable natural resources)
- Increased diversity and security of energy supply.
- Mitigation of natural gas prices due to displacement of some gas-fired generation or a more efficient use of natural gas due to significantly increased fuel conversion efficiencies.
- Reduced volatility of power prices, given stable or non-existent fuel costs for renewables.
- Local economic development resulting from new jobs, taxes, and revenue associated with new renewable capacity.

Because it is a market-based program, an RPS also has several operational benefits:

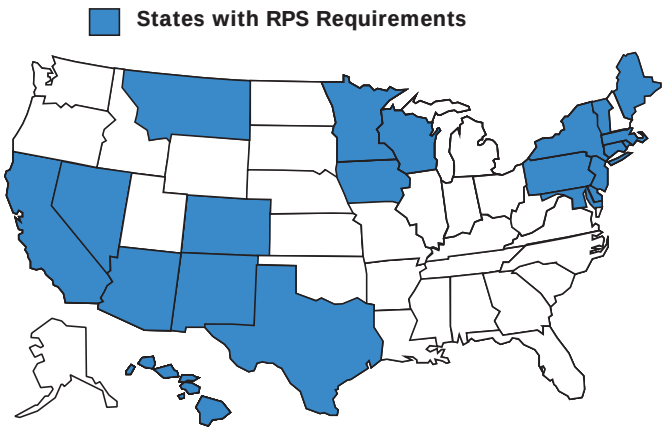
- Achieves policy objectives efficiently and at relative modest cost (ratepayer impacts range from less than 1% increases to 0.5% savings).
- Spreads compliance costs among all customers.
- Minimizes the need for ongoing government intervention.
- Functions in both regulated and unregulated state electricity markets.
- Provides a clear and long-term target for renewable energy generation that can increase investors' and developers' confidence in the prospects for renewable energy.

[1] CHP is the simultaneous generation of electric and thermal energy from a single fuel source.

generated from renewable sources by a specified date. While RPS requirement differ across states, there are generally three ways that electricity suppliers may comply with the RPS requirements;

- Own a renewable energy facility and its output generation.
- Purchase Renewable Energy Certificates (REC)[2].
- Purchase electricity from a renewable facility inclusive of all renewable attributes (sometimes called “bundled renewable electricity”).

### *Figure 1 States with RPS Requirements*




**Note:** In Minnesota, an RPS is applicable only to the state's largest utility, Xcel Energy, which is required by special legislation to build or contract for 1,125 MW of wind by 2011 and 125 MW of biomass electricity. The other Minnesota utilities must make a "good faith effort" to meet a Renewable Energy Objective that is not mandatory.

**Source:** Navigant Consulting, Inc. 2005; California Energy Commission; Database of State Incentives for Renewable Energy (DSIRE).

## Which States Have Established Renewable Portfolio Standards?

As of September 2005, RPS requirements have been established in 21 states plus the District of Columbia (see Figure 2). Over 2,300 MW of new renewable energy capacity through 2003 is attributable to RPS programs, including approximately 47% of new wind capacity additions in the U.S. between 2001 and 2004[3].

Tremendous diversity exists among these states with respect to the minimum requirements of renewable energy, implementation timing, and eligible technologies and resources (see Figure 3).

[2] A REC is a tradable right to claim the environmental and other attributes associated with 1 MWh of renewable electricity from a specific generation facility.

[3] Petersick, T. 2004. *State Renewable Energy Requirements and Goals*, Status through 2003. U.S. EIA. July.

## What are the Key Features of a Renewable Portfolio Standard?

States have tailored their RPS requirements to satisfy particular policy objectives, electricity market characteristics, and renewable resource potential. Consequently, there is wide variation in RPS rules from state to state with regard to the minimum requirement of renewable energy, implementation timing, eligible technologies and resources, and other policy design details. The key features of effective RPS requirements are outlined below.

***Goals and Objectives.*** To produce the best RPS design for the state, it is important to articulate goals and objectives early in the process. Clear goals serve as a guide for design choices and avoid protracted rule implementation debate. There can be multiple goals for an RPS, and some states aim for a broader set of objectives than others. Examples of broader goals and objectives: local, regional, or global environmental benefits; local economic development goals; hedging fossil fuel price risks; and advancement of specific technologies.

### *Figure 2: State RPS Requirements*

| | Target | Other |
|---|---|---|
| AZ | 1.1% by 2007 | 0.66% solar by 2007 |
| CA | 20% by 2017 | |
| CO | 10% by 2015 | 0.4% solar by 2015 |
| CT | 10% by 2010 (7% tier 1) | |
| DC | 11% by 2022 | 0.386% solar by 2022 |
| DE | 10% by 2019 | |
| HI | 8% by 2005, 20% by 2020 | |
| IA | 105 MW (2% by 1999) | |
| MA | 4% by 2009 ( +1%/year after) | |
| MD | 7.5% by 2019 | |
| ME | 30% by 2000 incl. some non-RE | |
| MN | 10% by 2015 (1% biomass) | See Figure 2 |
| MT | 15% by 2015 | |
| NJ | 6.5% by 2008 (4% tier 1) | 0.16% solar (95 MW) by 2008 |
| NM | 5% by 2006, 10% by 2011 | |
| NV | 20% by 2015 | 5% of RPS solar by 2013 |
| NY | 24% by 2013 | 0.154% customer-sited by 2013 |
| PA | 18% by 2020 (8% is RE) | 0.5% solar by 2020 |
| RI | 16% by 2019 | |
| TX | 2,280 MW by 2007; 5,880 MW by 2015 | |
| VT | Total incremental energy growth between 2005-2012 to be met with new renewables (cap 10% of 2005 sales ) | |
| WI | 2.2% by 2011 | |

**Source:** Navigant Consulting, Inc. 2005, California Energy Commission and the Database of State Incentives for Renewable Energy (DSIRE).

***Applicability.*** RPS requirements are most commonly applied to investor-owned utilities and electric service providers. It is unusual for mandatory RPS requirements to extend to municipal utilities and cooperatives, as these entities are predominately self-regulated. However, some states have included provisions for municipal utilities and cooperatives to voluntarily join the RPS program or to "self certify".

***Eligibility.*** States are finding that defining which energy resources and technologies qualify as eligible under RPS requirements (see Figure 1) can be a complex process. Eligibility usually depends on whether or not an energy resource or technology supports the goals and objectives established for the RPS. Issues that states typically have considered include:

- What fuel sources and technologies are eligible?
- Do existing renewable sources count toward compliance?
- What geographic areas are eligible (e.g., generation within the state boundary or within a regional power pool)?
- Are central and customer-sited systems treated differently?

***Structure.*** The structure of an RPS can influence investor confidence, the ability of markets to develop, and opportunities for project developers and investors to recover capital investments. The critical structural elements include:

- Method of accounting for renewable energy (e.g., energy production versus installed capacity requirements; RECs or bundled energy only).
- Time horizons for compliance periods.
- Mandatory or voluntary participation.
- Flexible compliance mechanisms to guard against high prices or the lack of supply of renewable energy (e.g., credit for early compliance, forward compliance banking, deficit banking, establishment of true-up periods, alternative compliance payments).
- Coordination with other energy policies at the Federal level (e.g., Federal Production Tax Credit) and the state level (e.g., system benefit charges, interconnect standards).
- Cost recovery mechanisms for utilities.
- Enforcement mechanisms for non-compliance.
- The incorporation of "technology tiers" and/or "credit multipliers" to encourage particular technologies (e.g., solar photovoltaic).

## Elements of a Successful Policy

Based on the experiences of states that have instituted an RPS, a number of best practices have emerged for designing and implementing an effective RPS. These best practices include:

### *Figure 3: Eligible Technologies under State RPS Requirements*

| | AZ | CA | CO | CT | DE | DC | HI | IA | MA | MD | ME | MN | MT | NJ | NM | NV | NY | PA | RI | TX | VT | WI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Biomass | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| CHP/Waste Heat[2] | | | | ● | | | ● | | | | ● | | | | | ● | | ● | | | | |
| Energy Efficiency | | | | | | | ● | | | | | | | | | ● | | ● | | | | |
| Fuel Cells[4] | | | | ● | | | | | | | ● | ● | | ● | ● | | | ● | | | | |
| Geothermal | ● | ● | ● | | ● | ● | ● | | | ● | ● | | ● | ● | ● | ● | | ● | ● | ● | | ● |
| Hydro | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Landfill Gas | ● | ● | ● | ● | ● | ● | ● | | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Municipal Waste | | ● | | ● | | ● | ● | ● | | ● | ● | ● | ● | ● | | ● | | ● | | | ● | |
| Ocean Thermal | | ● | | ● | ● | ● | ● | | ● | ● | | | | | | | ● | | ● | ● | | |
| PV | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Solar Thermal Electric | ● | ● | | ● | ● | ● | ● | | ● | ● | ● | ● | ● | | ● | ● | | ● | | ● | ● | ● |
| Tidal | | ● | | ● | ● | ● | | | ● | ● | ● | | | ● | | | ● | | ● | ● | | ● |
| Transportation Fuels | | | | | | | ● | | | | | | | | | | | | | | | |
| Waste Tire | | ● | | | | | | | | | ● | | | | | | | | | | | |
| Wave | | ● | | ● | ● | ● | ● | | ● | ● | | | | ● | | | ● | | ● | ● | | ● |
| Wind | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |

4. Includes only those states that allow fuel cells using non-renewable energy sources of hydrogen. Some states allow only renewable fuel cells (CA, CO, DE, MA, MD,NY, RI, WI) as eligible technologies.

**Source:** Navigant Consulting, Inc. 2005; Database of State Incentives for Renewable Energy (DSIRE).

- Develop broad support for an RPS, including top-level support of the Governor and/or legislature.
- Hold facilitated discussions among key stakeholders regarding appropriate RPS design. Key stakeholders include:
- State legislatures
- Public Utility Commissions
- Electric utilities and competitive electric service providers
- Developers of CHP and renewable energy systems
- Other stakeholders include state and local government officials, environmental organizations, ratepayer advocates, labor unions, and others.
- Clearly articulate all RPS goals and objectives because these will drive RPS rules and structure.
- Specify which renewable energy technologies and resources will be eligible, driven by the stated goals and objectives. Also, consider state and regional resource availability if a goal is to encourage resource diversity through a technology tier.
- Determine the mix and amount of renewable energy desired. Careful analysis and modeling of the expected impacts prior to establishing the targets are the keys to success.
- Consider using energy generation (not installed capacity) as a target; establish a long timeline to encourage private investment; make compliance mandatory for all retail sellers; allow utility cost recovery; and establish cost caps.
- Consider adopting (or improving) net metering and interconnection standards to facilitate customer-sited clean DG projects that may be eligible technologies under an RPS.
- Establish a transparent and easy-to-use accounting system for compliance.
- Make sure a credible non-compliance mechanism is in place in the form of penalties, but provide retail suppliers with some flexibility in their compliance.
- Select the most appropriate lead agency or organization to implement the RPS.
- Conduct a mid-course performance review, identify the reasons for any delay in meeting targets, and enact program modifications as needed to meet the original intent of the RPS.

## EPA Assistance Available

The EPA Combined Heat and Power Partnership is a voluntary program that seeks to reduce the environmental impact of power generation by promoting the use of cost-effective CHP. The Partnership helps states identify opportunities for policy developments (energy, environmental, economic) to encourage energy efficiency through CHP. The Partnership can provide information and assistance to states considering including CHP or waste heat recovery in their RPS requirements (*www.epa.gov/chp*).

The EPA Green Power Partnership provides assistance to renewable generators in marketing RECs and helps educate potential REC buyers about resources. The Partnership may be of assistance to states that employ RECs as a compliance measure for their RPS requirements but also allow for purchase and retirement of RECs for organizational "green power" designation (*www.epa.gov/greenpower/*).

## Additional Resources

EPA has created *The Clean Energy-Environment Guide to Action*. The guide provides an overview of clean energy supply technology options and, in addition to RPSs, presents a range of policies that states have adopted to encourage continued growth of clean energy technologies and energy efficiency. The Guide is available at *www.epa.gov/cleanenergy*.

The *Database of State Incentives for Renewable Energy (DSIRE)* is a comprehensive source of information on state, local, utility, and selected federal incentives that promote renewable energy (*www.dsireusa.org*).

The National Association of Regulatory Utility Commissioners' report *The Renewable Portfolio Standard: A Practical Guide* provides detailed guidance on designing and implementing an RPS (*www.naruc.org*)

***For more information, contact:***

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